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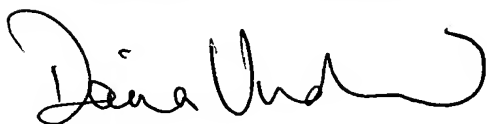
That I am knowledgeable in the English language and in that language in which the below identified International Application was filed, and that I believe the English translation of International Application No : PCT/FR03/01262 is a true and complete translation of the above-identified International Application as filed.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the Application or any Patent issued thereon.

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SEALING DEVICE, RECEPTACLE FITTED WITH ONE SUCH DEVICE AND METHOD
FOR THE PRODUCTION OF ONE SUCH DEVICE

The invention relates to a sealing device and to a receptacle fitted with
5 such a device. The invention also relates to a method for producing such a
device and to a method for sealing a receptacle with the aid of such a device.

In the domain of packaging of food products, it is known to fit a bottle
made of extruded or blown plastics material with a peel-off inner capsule
welded by induction heating on the edge of the neck of the bottle. Such an inner
10 capsule must be peeled off by hand and thrown away when the contents of such
a bottle are used for the first time. This peel-off operation is relatively delicate
and may be imperfectly carried out, particularly by a child or an elderly person
whose fingers have lost their agility. In addition, this operation requires that the
user go to a garbage can to throw the capsule away, unless he/she leaves the
15 latter lying on a table.

It is known from CH-A-556 274 to fit a stopper with an inner rib intended
to retain in position a disc provided with an aluminium foil. In order to install
the disc in the stopper, it is necessary to deform it temporarily. As a result, a
deformation of the disc in the opposite direction can lead to its involuntary
20 extraction from the stopper, in particular when a bottle is opened the first time.
In addition, when the disc is being positioned in the stopper, there exists a risk
of damaging its peripheral edge, this affecting the obtained seal negatively. Such
a device can therefore not be considered as reliable.

The same applies to the devices known from US-A-5 346 082, US-A-4 473 163 and US-A-5 984 124.

It is a more particular object of the invention to overcome these drawbacks by proposing a novel sealing device which comprises an inner
5 sealing capsule welded on a neck before a receptacle is used the first time, in which it is not necessary to peel off the inner capsule by hand in order to have access to the contents of the receptacle, and whose functioning is reliable.

In this spirit, the invention relates to a sealing device for sealing a receptacle provided with a threaded neck, this device comprising a stopper
10 adapted to close this neck, an inner capsule adapted to be glued to or sealed on the edge of this neck, a sealing disc on which the inner capsule is fixed, this disc projecting radially outside the neck, and a ring provided with an inner thread adapted to cooperate with the outer thread of the neck, this ring being fitted with at least one projection which extends in the direction of the disc and
15 which is adapted to exert a pushing effort on the disc in a direction in which the disc is spaced in relation to the neck. This device is characterized in that the afore-mentioned projection extends, from an edge of the ring, essentially in an axial direction.

Thanks to the invention, an appropriate manipulation of the ring makes it
20 possible to exert, thanks to the projection, a localized thrust sufficient to move the disc away from the neck, this making it possible to disconnect the inner capsule, which remains fast with the disc, with respect to the neck. In this way, the tedious operation of peeling off the inner capsule by hand, as is necessary in the state of the art, can be dispensed with. If desired, the disconnection of the
25 inner capsule with respect to the neck can be indicated by a

sound signal, for example of "click" type. The particular orientation of the projection in an axial direction allows it to act efficiently on the disc.

The invention also relates to a receptacle, such as a bottle made of plastics material, fitted with a sealing device as described previously. Such a receptacle
5 is easier to manipulate than known equipment, particularly when used for the first time.

The invention also relates to a method for producing a device as described previously and, more specifically, to a method in which are carried out steps consisting in:

- 10 a) manufacturing a ring provided with an inner thread adapted to cooperate with the outer thread of the neck;
 - b) manufacturing a sealing disc;
- characterized in that it comprises steps consisting in:
- c) providing the ring, on its outer radial surface, with elements in relief;
 - 15 d) providing the ring with at least one projection extending, from one edge of this ring, essentially in an axial direction;
 - e) manufacturing a cap adapted to cover the neck and the ring screwed on this neck;
 - f) providing this cap, on its inner radial surface, with elements in relief;
 - 20 g) introducing the sealing disc in the cap;
 - h) introducing the ring in the cap, bringing the elements in relief, respectively provided on the outer radial surface of the ring and on the inner radial surface of the cap, into engagement, by directing the projections towards said disc and by blocking said disc in the cap thanks to said ring.

Advantageously, steps c) and d) are carried out at the same time as step a) which is a step of moulding the ring.

Similarly, step f) is advantageously carried out at the same time as step e) which is a step of moulding the cap.

5 According to an advantageous aspect of the invention, during steps a) to f), the ring, the cap, the disc and the projection are dimensioned and positioned so that the projection is adapted to withdraw the disc from the neck, while the device is being unscrewed with respect to the neck.

10 Finally, the invention relates to a method for sealing a receptacle by means of a device manufactured in accordance with the afore-mentioned method, in which the disc is fixed on the neck, for example by heat-sealing an inner capsule borne by the disc, after the device has been positioned on the neck.

15 The invention will be more readily understood and other advantages thereof will appear more clearly in the light of the following description of two forms of embodiment of a receptacle and of a sealing device according to the invention, given solely by way of example and made with reference to the accompanying drawings, in which:

Figure 1 is a view in perspective, with parts torn away, of the neck of a bottle fitted with a sealing device according to the invention.

20 Figure 2 is an exploded view in perspective of the sealing device of Figure 1.

Figure 3 is an axial half-section of the neck of a bottle fitted with the sealing device of Figures 1 and 2.

25 Figure 4 is an axial section of a sealing device in accordance with a second form of

embodiment of the invention mounted on the neck of a bottle, and

Figure 5 is a view similar to Figure 1 for the device of Figure 4, the neck of the bottle also being exploded. IV-IV indicates the plane of section of Figure 4.

5 The bottle B shown in Figures 1 and 3 comprises a neck 101 provided with an outer thread 111 and a part 112 of which the outer surface 114 is intended to receive in abutment an inner capsule 122 made of an aluminium-based complex and belonging to a sealing device 102. This inner capsule is glued, over substantially the whole of its surface, on a disc 121 of which the
10 peripheral edge 321 projects radially outside the outer radial surface 115 of the neck 101, the diameter D_{121} of the disc 121 being greater than the diameter D_{115} of the surface 115.

 A ring 124 is provided to be screwed on the neck 101 and is provided, to that end, with an inner thread 341 adapted to cooperate with the thread 111. This
15 ring is provided with three projections 344, 344' and 344" which extend, from its edge 345 closest to the disc 121, substantially in directions parallel to the central axis X-X' of the neck 101. The projection 344 is defined by a surface 344a substantially parallel to axis X-X' and an inclined surface 344b forming ramp, as is seen from the following explanations. The other projections have substantially
20 the same shape. The projections are regularly distributed over the edge 345.

 A cap 125 made in one piece of plastics material is provided to be mounted on the neck 101, surrounding the ring 124. The bottom 351 of this cap is parallel to the disc 121 and extends in a skirt 352 which surrounds the ring 124. In practice, the disc 121 is disposed in the vicinity of the inner surface 353
25 of the bottom 351, two

circular ribs 351a and 351b making it possible to exert on the disc 321 a localized effort F_2 for applying the inner capsule 122 against the edge 113 of the neck 101.

Furthermore, the skirt 352 is provided with a series of teeth 354 made on
5 its inner radial surface 355, these teeth being configured and positioned so that they can be in engagement with teeth 346 made on the outer radial surface 347 of the ring 124. In this way, the elements 124 and 125 are fast in rotation about axis X-X'.

The skirt 125 is also provided with a return 356, provided to engage in an
10 annular groove 348 made in the surface 347, so that the elements 124 and 125 are also fast in translation parallel to axis X-X'.

A tamper-proof ring is constituted by a part 349 of the ring 324 connected to its principal part by a cleavable zone 349a, part 349 being blocked on the neck 101 by a circular flange 116.

15 The inner capsule 122 is glued on the edge 112 until the bottle B is first used.

When an effort of unscrewing is exerted on the cap 125, the latter entrains the ring 124 due to the cooperation of the teeth 346 and 354. This has the effect of displacing the projections 344, 344' and 344" in the direction of the edge 321
20 of the disc 121, then of exerting on this edge a effort of thrust F_3 sufficient to separate the inner capsule 122 from the surface 114, since the connection between the elements 121 and 122 is permanent. The inclined nature of the surface 344b and of the equivalent surfaces confers to the effort F_3 a progressive nature as a function of the rotation of the ring 124.

The effort of thrust or of detachment F_3 is concentrated in the vicinity of the edge 321 of the disc 121, which improves its efficiency.

The disc 121 conserves a planar configuration, whatever the force of tightening of the ring 124 on the neck 101.

5 In particular, the disc 121 fitted with the inner capsule 122 may be positioned against the bottom 351 of the cap 125 without being deformed, as it may be positioned before the ring 124 is itself introduced in the cap 125.

When the disc is subjected to the localized effort F_3 exerted by the projections 344, 344' and 344", it is possible that it bends during a transitory
10 phase of detachment of the inner capsule 122 with respect to the neck 101. To that end, the space provided for receiving the edge 321 between the ring 124 and the cap 125 must be sufficiently wide and the fact of making the assembly 124-125 in two parts makes it possible to form such a space without difficulty during the respective moulding operations of these parts, which would not be
15 necessarily the case if such an assembly were moulded in one sole operation. In addition, the parts 124 and 125 may (be) made in different colours, this allowing a user to immediately recognize the type of sealing device which he/she must manipulate.

When the bottle B is to be resealed, it suffices to rescrew the ring 124, this
20 having the effect of applying the disc 121 against the part 112 of the neck 101 by a fresh transmission of the effort F_2 between the ribs 351a and 351b and the disc 121.

In other words, the device 2 is as easy to use as a conventional stopper not having an inner capsule, while it ensures a totally sealed closure of the
25 receptacle

that it fits as long as it has not been withdrawn therefrom at least once.

Manufacture of the sealing device 102 takes place by moulding, on the one hand, the ring 124 and, on the other hand, the cap 125 in their configurations shown in Figure 2. During these moulding operations, the projections 344, 344' and 344" and the teeth 346 of the ring 124, as well as the teeth 354 of the cap 125, are formed.

Furthermore, the sealing disc 121 is manufactured by moulding and the inner capsule 122 is glued on this disc.

The sealing disc is then introduced in the cap so that the disc 121 comes in the immediate vicinity of the inner surface 353 of the bottom 351, in abutment on the ribs 351a and 351b. The disc is placed in a position such that the inner capsule 122 is located on the face of the disc 121 opposite the bottom 351.

The ring 124 is then positioned in the cap 125, bringing the teeth 346 and 354 into engagement and directing the projections 344, 344' and 344" towards the disc, this inducing a blockage of the disc and of the inner capsule between the bottom 351 and the projections 344, 344' and 344".

It will be noted that this form of embodiment of the device 102 does not induce deformation of the disc 121 in order to position it, unlike the methods of manufacturing the devices known, for example, from CH-A-556 274.

In the second form of embodiment of the invention shown in Figures 5 and 6, the elements similar to those of the first embodiment bear identical references.

The bottle B of this embodiment comprises a neck 101 provided with an outer thread 111 on which a ring 124 provided with a thread 341 comes into engagement.

This ring is provided with a plurality of projections, of which only one is visible in Figures 4 and 5 with reference

344 and which extend substantially from an edge 345 of the ring 124 in a direction parallel to a central axis X-X' of the neck, of the ring and of an associated cap 125.

The ring 124 has a geometry somewhat different from that of the first
5 embodiment, but its functioning is similar.

In particular, the ring is provided with teeth 346 adapted to cooperate with internal teeth 354 of the skirt 352 of the cap 125, so as to be driven in rotation about axis X-X' by this cap, which induces a displacement of the ring 124 opposite the bottom of the bottle B, this having the effect of bringing the
10 projections 344 and equivalent into abutment against the peripheral edge 321 of the disc 121 and of allowing its disconnection with respect to an inclined part 112 of the neck 101.

As previously, the disc 121 may be positioned against the bottom 351 of the cap 125 before the ring 124 is introduced in this cap.

15 The ring 124 is provided with an outer radial flange 348 adapted to be received in an inner shoulder 358 of the skirt 352, this ensuring an efficient positioning of these elements 124 and 125 with respect to each other. It will be noted that, when the bottle B is closed, the projection 344 is spaced apart from the disc 121 by a non-zero distance d , this avoiding local deformation of the
20 edge 321 by the projections 344 and equivalent.

The assembling of the device 102 of this form of embodiment is effected with a method similar to that explained with reference to the first embodiment.

Whatever the form of embodiment envisaged, the mode of assembly of the disc 121 in the cap 125 avoids the risks of damage of the disc, such damage
25 negatively affecting the tightness of the seal obtained.

This is important insofar as an aseptic seal is often sought.

The invention is not limited to the embodiments described, which may be modified. In particular, the technical characteristics of the two embodiments shown may be combined together.